



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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COMMISSIONER

**Verso Androscoggin LLC
Franklin County
Jay, Maine
A-203-77-5-A**

**Departmental
Findings of Fact and Order
New Source Review
License**

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., § 344 and § 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Verso Androscoggin LLC
CURRENT PART 70 LICENSE NUMBER	A-203-70-A-I
LICENSE TYPE	06-096 CMR 115, Minor Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp and Paper Mill
FACILITY LOCATION	Jay, Maine
NSR LICENSE ISSUANCE DATE	January 6, 2009

B. Description of Proposed Changes

Verso Androscoggin LLC (Verso Androscoggin) of Jay, Maine submitted an application in April of 2008 to make two changes to the mechanical groundwood operation in an effort to increase production capacity of that operation while decreasing energy and water consumption on a production unit basis. In October of 2008 Verso Androscoggin submitted a supplement to the April application which included revised baseline and future license allowed VOC emission calculations based on recent testing completed at the source. The supplement also included proposed changes to the groundwood operation that were not included in the original application. These proposed changes are subject to the New Source Review (NSR) provisions contained in *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115. This license addresses the two proposed projects described in the April application as well as the proposed changes described in the supplement to the application submitted in October. The proposed changes are planned to be implemented beginning this year and continuing through a multi-year optimization process. The proposed changes may

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include any or all of the changes described below.

- Replacing the screen basket in the primary #2 screen with a screen basket that has more open area, thereby increasing the amount of acceptable pulp produced in this part of the process. The current screen basket open area is currently a bottleneck in the groundwood pulping process. Once the screen basket is replaced with one with more open area, the grinders will be able to process more wood resulting in a potential increase in actual emissions of volatile organic compounds (VOCs) from the Grinders Source Group.
- Adding magnesium hydroxide ($Mg(OH)_2$), (or equivalent alkali source), in the grinder showers and at the reject refiner. The addition of $Mg(OH)_2$ at these locations in the groundwood pulping process will change the chemistry of the pulp by increasing its pH. This change in chemistry will soften the lignin in the wood fibers making it easier to process by reducing the amount of energy that goes into the pulping process and allowing more wood to be processed at the same amount of energy applied, resulting in a potential increase in actual emissions of VOCs from the Grinders Source Group.
- Improvements to the delivery system of wood to the groundwood mill and to the grinders.
- Improvements to the sinking board chutes and offset chutes.
- Improvements in the screening of groundwood pulp.
- Increasing the S1 screen sheave speed.
- Relocating the 3rd Hydrosieve and/or recirculating the pressate instead of sewerage it.
- Installing the old R2 screen in parallel with the P2 screen.
- Changing the S1 screen basket.
- Improvements in the refining of groundwood pulp.
- Adding a low consistency refiner.

The primary purpose of these projects is to increase production of groundwood pulp at the facility. All of these changes combined are anticipated to increase the production capacity of the Grinders Source Group from the current level of 360 air dried tons of pulp per day (ADTP/day) to an estimated capacity of 480 ADTP/day. Although the current air emission license lists the Grinders Source Group production capacity as 360 ADTP/day, the actual production rate for the process (an average of the most recent two year period, 2006 – 2007) was 273 ADTP/day.

A secondary effect of these projects will be to increase the efficiency of the groundwood pulping process, in part by decreasing the energy and water consumption associated with producing each ton of groundwood pulp. Apart from VOC emissions, the mechanical pulping process results in releases to the

atmosphere that are not process-related but are caused by energy generation on-site. Electrical power at the Mill is both purchased from sources off-site and generated through the combustion of different types of fossil fuels and renewable wood residuals like bark. Because the project will result in less electrical consumption, emissions associated with electrical generation at the Mill will not be increased by the project. The only steam demand in the Groundwood Mill is for building heat which will not be affected by the proposed projects in this application. Therefore, the projects will not result in an increase in steam use and will not increase emissions from the Mill's boilers.

The completion of these projects will not result in an increase in paper production as the additional groundwood pulp will be used in place of other chemical additives currently used in the papermaking process.

These proposed changes have been determined to be physical changes to the groundwood pulping process and will be treated as a modification requiring a new source review (NSR) license. The groundwood pulping operations are not subject to any new source performance standards (NSPS) or maximum achievable control technology (MACT) standards.

C. Emission Unit Description

The following emission unit is addressed in this air emission license:

Process Equipment

<u>Equipment</u>	<u>Production Rate</u>	<u>Pollution Control Equipment</u>	<u>Stack #</u>
Grinders Source Group	360 ADTP/day (old) 480 ADTP/day (new)	None	Various

Grinders Source Group - Background Information

The Grinders Source Group consists of six grinders and the grinder flume. The grinders receive debarked logs from the Woodyard and discharge groundwood pulp slurry that is conveyed by the grinder flume. The Grinders Source Group has a current listed capacity of 360 air dried tons of unbleached pulp per day (ADTP/day). Verso Androscoggin estimates that the capacity of the Grinders Source Group after some or all of the proposed changes are made will be 480 ADTP/day. Emissions from the Grinders Source Group primarily vent to four emission points.

In 1995 International Paper Company (IP), the previous owner of the facility, conducted an alternative VOC reasonable available control technology (RACT) analysis for the Grinders Source Group pursuant to 06-096 CMR 134. Control alternatives considered included thermal oxidation, incineration, adsorption, absorption and condensation, of which only thermal oxidation was found to be a technically feasible option. Although technically feasible, thermal oxidation was not found to be an economically feasible option, costing about \$8,500 per ton of VOC abated. Furthermore, thermal oxidation requires the combustion of a supplemental fuel, which results in corollary negative environmental impacts. The Department determined that VOC RACT for the Grinders Source Group was to be the continued employment of good operational controls and maintenance procedures.

In 2004 IP was licensed to install a water jet sharpening/conditioning system to operate on the groundwood stones in Amendment A-203-71-BF-A to their 06-096 CMR 115 license. The water jet sharpening system utilizes an ultra-high pressure water jet to remove material from the surface of the stone, thus sharpening and maintaining the grinding stone without having to remove the stone from the grinder. This increases stone life and decreases the downtime associated with off-line mechanical sharpening. BACT for the proposed system was determined to be no control in License A-203-71-BF-A.

VOC RACT testing conducted in 1995 in the groundwood area determined a VOC emission rate for the groundwood pulping process of 5.51 lb VOC/ADTP. With the installation of the water jet system, the Grinders Source Group was subject to a license allowed VOC emission limit of 374.6 TPY. In June and July of 2008, Verso Androscoggin conducted additional testing at the groundwood mill to develop separate VOC emission factors for hardwood and softwood. This testing resulted in VOC emission factors of 0.120 lb/ADTP for hardwood and 3.648 lb/ADTP for softwood.

D. Application Classification

The application does not violate any applicable federal or state requirements and does not request a relaxation in monitoring, reporting, testing or record keeping requirements, therefore this application is not considered an amendment to Verso Androscoggin's Part 70 License, however, any license conditions contained in this license that either alter or are in addition to existing Part 70 license conditions will be incorporated into Verso Androscoggin's Part 70 License.

This application is being processed under the New Source Review (NSR) licensing provisions contained in *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115. The application includes a Best Available

Control Technology (BACT) analysis performed per New Source Review requirements.

Additionally, the modification of a major source is considered a major modification based on whether or not expected emissions increases exceed the "Significant Emission Increase Levels" as given in *Definitions Regulation*, 06-096 CMR 100 (last amended December 1, 2005).

The net emission increases are typically determined by subtracting the average actual emissions of the 24 months preceding the modification (or other representative 24 month period) from the projected future actual emissions. Verso Androscoggin submitted information demonstrating that recent operation of the groundwood mill is not representative of past or planned wood species mix and proposed the use of the 1998 thru 1999 period as being more representative of the wood species mix that has been processed in the past and that they plan on processing in the near future. Verso Androscoggin proposes to maintain future VOC emissions from the Grinders Source Group to no more than 39.9 TPY above the 1998/1999 baseline VOC emissions as determined based on the latest VOC emission factors obtained through testing and on the wood species mix processed during the 1998/1999 timeframe. Therefore, Verso Androscoggin proposes to maintain future VOC emissions from the Grinders Source Group below the levels indicated in the table below:

Pollutant	Average Past Actual Emissions 1998/1999 (ton/year)	Future License Allowed Emissions (avg. past actual emissions plus slightly less than the Significant Emissions Increase Level for VOCs) (ton/year)	Net Change (ton/year)	Significant Emissions Increase Levels (ton/year)
VOC	86.8	126.7	39.9	40

Note: The above numbers are for the Grinders Source Group only. None of the other emission units at the facility are affected by this license.

The projected increase in VOC emissions are slightly below the significant emissions increase level associated with a major modification, therefore the modification is determined to represent a minor modification.

Based on the above information, this license is determined to be a minor modification NSR license under *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115 (last amended December 1, 2005) and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in 06-096 CMR 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

The Mill is not located in a designated non-attainment area. BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 CMR 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. BACT Determination

VOCs are the only pollutants emitted by the Grinders Source Group that are addressed in the Part 70 air emission license. A summary of the BACT determination for the Grinders Source Group is the following:

Volatile Organic Compounds (VOC)

The application of a particular control technology depends on the gas stream under consideration. Different air pollution control technologies can be applied to sources, once they are covered, enclosed, or vented in order to capture and then recover or destroy the VOC emissions. A control technology is selected based on stream-specific characteristics (flow rate, hydrocarbon concentration, temperature, moisture content, etc.) and the desired control efficiency. Control of VOC emissions from the Grinders Source Group might include the application of add-on control devices. Relevant add-on control options include carbon adsorption, absorbers (scrubbers), condensers, biofilters, and thermal oxidation. The concentration of organics in the gas stream is a key characteristic that affects the feasibility of a particular control technology. VOC emissions from mechanical pulping operations are generally not controlled. Efficient heat recovery systems can reduce amounts of VOC compounds emitted through vents by condensation of steam and discharge of the condensates. VOC control systems have been installed on Thermal Mechanical Pulping (TMP) lines in Texas and Minnesota. The emission controls involved turpentine recovery, condensate

stripping, and incineration using a regenerative thermal oxidizer. Verso Androscoggin's review of the EPA's RACT/BACT/LAER Clearinghouse for similar sources found that three out of four sources were not required to apply thermal oxidation as a control technology and the source where it was required was a much larger, pressurized mechanical groundwood pulping operation.

In 1995, the Mill conducted an alternative VOC RACT for the Grinders Source Group pursuant to Chapter 134. Control alternatives considered included thermal oxidation, incineration, adsorption, absorption and condensation, of which only thermal oxidation was found to be a technically feasible option.

In addition to add on control options such as thermal oxidation identified in the VOC RACT analysis, the Mill also considered a combination of heat recovery and condensation as a feasible control option as well as process efficiency upgrades that reduce power demand and water usage. In summary, the Mill identified the following three control technologies as feasible and that warranted consideration in this BACT analysis for possible application at its groundwood facility:

1. Thermal Oxidation
2. Heat Recovery/Condensation
3. Process Efficiency Upgrades

Review of Thermal Oxidation

The Mill found that, although technically feasible, thermal oxidation is not an economically feasible option. In 1995 the Mill determined that the cost to control VOC from its groundwood operations by thermal oxidation would be about \$8,500 per ton of VOC abated. In 2004 a revised cost analysis was completed for the water-jet sharpening project. The 2004 BACT study estimated that the cost to remove VOCs would be approximately \$4,279 per ton removed. This 2004 economic analysis was based on using a regenerative thermal oxidizer to capture and control 375 tons of VOC per year from the wood grinding operations with a destruction rate of 98 percent reduction in VOCs. The high cost results from controlling a 140,000 ACFM emission stream which consists of saturated steam and an average VOC concentration of 200 ppmv. Even though thermal oxidizers may recover waste heat energy from the exhaust gases, this does not reduce the amount of supplemental fuel required by any significant amount, because of the process exhaust's high moisture content and low VOC concentration. High annual operating costs occur because a large amount of natural gas is consumed annually to support combustion and a large amount of power is used to draw the high-volume air flow through the thermal oxidizer. In addition, the capital cost alone is over one million dollars for a regenerative thermal oxidizer sized to control 140,000 ACFM (see June 2004 Application). Because the Mill has not

substantially altered its operation and/or emissions parameters and because thermal destruction technology and costs have not changed substantially since this analysis was performed, the Mill states that a cost of \$4,279 per ton of VOC abated (or possibly even higher given inflation, cost of raw materials, and fuel costs) for this technology continues to not be economically justifiable. This cost effectiveness number is even higher when based on the emissions reduction potential using the lower emission factors obtained during testing in the summer of 2008. The information provided in Table 2-1 of the application is a summary of controls applied to groundwood operations located in Maine at pulp mills. The data in the table documents that no other sources in the State are required to control VOC emissions from mechanical groundwood operations using thermal destruction, which is consistent with the Mill's BACT Analysis for this project. Table 2-2 of the application includes a summary of recent BACT findings posted on the EPA's RACT/BACT/LAER Clearinghouse (RBLC) site for similar sources. Three of the four projects did not require thermal oxidation. The one that did is a much larger pressurized mechanical pulping operation.

In summary, the Mill stated in their application that thermal oxidation is not economically justifiable for this project, which they state is consistent with decisions made for other similar mechanical groundwood operations in Maine as well as nationally.

Review of Heat Recovery/Condensation Combined with Process Efficiency Upgrades

Techniques for reducing emissions to air also include efficient heat recovery from refiners and abatement of VOC emissions from contaminated steam.

Direct emissions from the groundwood operations include VOCs such as alcohols and terpenes, methanol, and pinenes and are primarily released as a result of the heat that is generated by friction between the grinding stones and the pulpwood. Additional sources include refining equipment, storage tanks, reject refining systems, washers, and screens. The majority of emissions from the groundwood operations are released to two separate manifolds and ultimately exhaust through four stacks (one is currently disabled) via ~ 26,000 acfm fans at a temperature of about 100 to 140 °F. The stacks are located on the roof of the Groundwood Building. Verso Androscoggin recovers heat in the approximately 4,500 gallons/minute of filtered process water generated in its grinding and refining processes via a shell and tube heat exchanger. Recycled filtrate (process water) temperatures are reduced from approximately 170 °F to °120 F, reducing steam and evaporation losses and ultimately reducing the discharge of VOCs. Unrecovered heat losses are kept to a minimum and include refiner steam exhaust, flume exhaust vents and water discharged to the sewer in mid summer when the cooling water supply is insufficient to keep up with demand. Heat recovery in the

form of warmed water is about 40 million BTUs/HR at full production. Apart from VOC emissions, mechanical pulping generates releases to the atmosphere that are not process-related but caused by energy generation on-site. Heat and power are produced by combustion of different types of fossil fuels or renewable wood residuals like bark. Work is being done on refining technologies to decrease average energy consumption on a bone dry ton of pulp (BDTP) basis and increase the content of fines to improve the opacity of paper. Steam energy is only required during the winter for building heat. Verso Androscoggin believes that energy consumption can be reduced up to 10% on an average BDTP basis through a series of changes. Changing the P2 screen basket will improve sorting of fibers. This means that fewer good fibers will be processed in the high energy consumption rejects system, and it is estimated that the tons of fiber through that system could drop by 5%. This could have an energy/ton impact on the order of a 2% reduction per BDTP produced or .04MW/BDTP. Adding $Mg(OH)_2$ to the rejects could have a large impact on energy. Increasing the pH of the refining and grinding systems could reduce all energy consumed 1% to 10% or .02MW/BDTP to .2MW/BDTP. Essentially, some of the proposed changes are actually efficiency upgrades that will reduce average electrical power demand and thus reduce average combustion related emissions.

In summary Verso Androscoggin proposes that continued operation of its heat recovery systems represent Best Available Control Technology. Add on controls are not economically justifiable, which is consistent with findings for other non thermal or pressurized mechanical pulping sources in Maine and nationally.

The Department finds that add on controls for the reduction of VOC emissions from the Grinder Source Group are either not technically or economically feasible at this time.

C. Annual Emissions

The proposed minor modification will result in a reduction in the annual VOC emission limit from the Grinder Source Group from 374.6 TPY to 126.7 TPY and a corresponding reduction in the annual VOC emission limit from the facility from 1181.3 TPY to 933.4 TPY. The minor modification will result in no changes to any of the other annual emission limits currently existing in Verso Androscoggin's Air Emission Licenses, including any amendments.

III.AMBIENT AIR QUALITY ANALYSIS

Verso Androscoggin previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards. Neither short term nor long term emission limits of the air pollutants which have been addressed in previously submitted ambient air quality demonstrations will increase as a result of the minor modification being approved in this license. This license only allows an increase in actual emissions of VOCs which are not typically included in an ambient air quality analysis, therefore, no additional demonstration is required for this license.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-203-77-5-A pursuant to the preconstruction licensing requirements under 06-096 CMR 115, which allows Verso Androscoggin to complete the changes to the mechanical groundwood pulping operation as described in its application and in the findings of fact of this license. Verso Androscoggin shall continue to be subject to the standard and special conditions listed in their initial Part 70 License, A-203-70-A-I, and in any subsequent Part 70 or NSR licenses. Verso Androscoggin shall also be subject to the new license conditions listed below.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

(1) **Grinder Source Group**

Actual annual emissions of VOCs from the Grinder Source Group shall not exceed 126.7 TPY. Compliance with this limit shall be demonstrated by maintaining records of groundwood pulp production rates (in ADTP) specific to wood species processed (hardwood/softwood) on a monthly basis and by

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calculating VOC emissions in tons, based on an emission rate of 0.120 lb of VOC/ADTP for hardwood and 3.648 lb of VOC/ADTP for softwood on a 12-month rolling total basis.

DONE AND DATED IN AUGUSTA, MAINE THIS *6th* DAY OF *January* 2009.
DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: *James P. Brodeur*
DAVID P. LITTELL, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: April 7, 2008

Date of application acceptance: April 25, 2008

Date filed with the Board of Environmental Protection: _____

This Order prepared by Eric Kennedy, Bureau of Air Quality.

